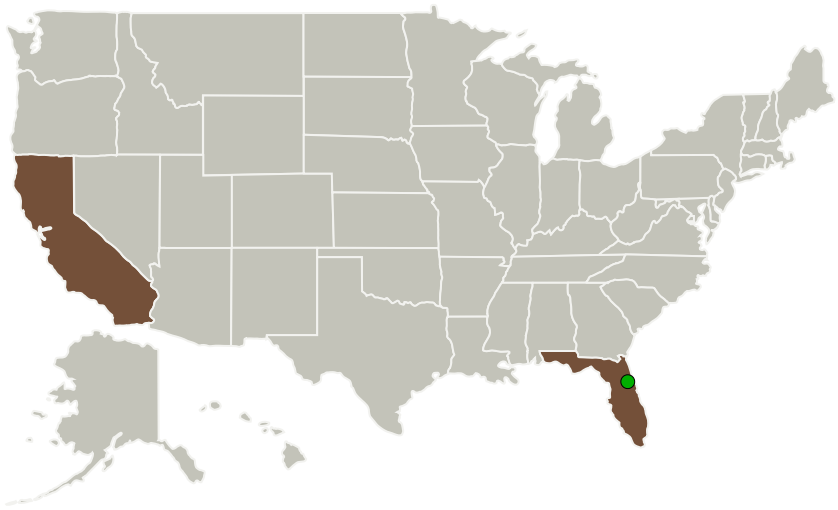
Polymer-Reinforced, Nonbrittle, Lightweight Cryogenic Insulation for Reduced Life-Cycle Costs, Phase II

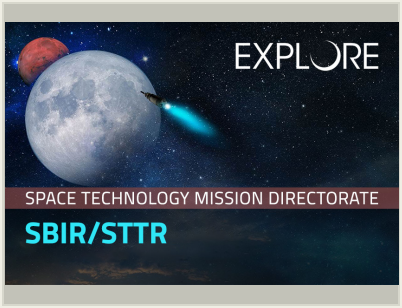
Completed Technology Project (2011 - 2013)

Project Introduction

This Phase II SBIR project focuses to continue developing cryogenic insulation foams that are flexible, deforming under compression. InnoSense LLC (ISL) demonstrated enhanced structural and insulation properties in Phase I to establish NASA use potential. In particular, ISL demonstrated a 30% increase in thermal shielding properties over baseline polyurethane foams. These foams were easily formed into a variety of shapes resisting high impact loads without damage. The coated foams were extremely hydrophobic showing excellent resistance to moisture. These materials insulated liquid nitrogen temperatures with one inch of insulation thickness. Upon fine tuning the foam formulations in Phase II, cryogenic insulation performance will be tested at liquid hydrogen and liquid oxygen temperatures. ISL has teamed with a large NASA prime contractor for computer modeling and performance validation during Phase II. For assuring success, ISL has committed $100K of co-funding during Phase II, and secured $300K as Phase III Follow-on funding from a commercialization partner. A technical and business team is now in place for successful execution of the project. At project end, we expect to achieve a TRL Level of at least 6 from 3 in the beginning.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Innosense, LLC	Lead Organization	Industry Minority-Owned Business, Small Disadvantaged Business (SDB), Women-Owned Small Business (WOSB)	Torrance, California
Kennedy Space Center(KSC)	Supporting Organization	NASA Center	Kennedy Space Center, Florida

Primary U.S. Work Locations	
California	Florida

Project Transitions

June 2011: Project Start

September 2013: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139340)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Innosense, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

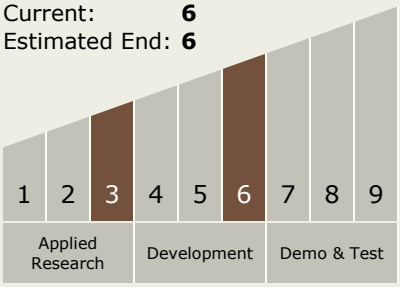
Carlos Torrez

Principal Investigator:

David C Hess

Technology Maturity (TRL)

Start: **3**
Current: **6**
Estimated End: **6**



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Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.1 Cryogenic Systems
    - TX14.1.2 Launch Vehicle Propellant

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System